

## **Claims**

What is claimed is:

1. A method which processes an input string to generate a fractal semantic network, the method comprising the steps of:

5 parsing said input string to generate an initial parse structure comprising a plurality of parse elements;

generating semantic units from some of said parse elements by employing a set of mapping rules which maps certain types of said parse elements into said semantic units, whereby some of said semantic units are information objects and some are connection  
10 objects;

generating said fractal semantic network by arranging said information objects and said connection objects in a fractal manner, where the relation between said information objects is represented by said connection objects, whereby said information objects and said connection objects are derived from a small set of basic building blocks.

15 2. The method of claim 1, whereby said parse elements comprise a classifier characterizing the type of said parse element, and a representation describing the relation

between said parse elements, and feature information describing the features of said parse element.

3. The method of claim 1, whereby there are hierarchical connection objects and non-hierarchical connection objects.

5 4. The method of claim 3, whereby due to the fact that said hierarchical connection objects are employed, said fractal network structure having at least two levels of hierarchies.

6. The method of claim 1, whereby said fractal semantic network is self-similar across all hierarchies since said information objects and said connection objects  
10 are derived from said small set of basic building blocks.

6. The method of claim 1, wherein said input string is a sequence of **m** words, preferably a single sentence.

7. The method of claim 6, wherein **m** semantic units are created during said parsing step, with one semantic unit per word, or per sentence, or per a whole story.

15 8. The method of claim 2, wherein said representation describing the relation between said semantic units is examined when generating said fractal semantic network.

9. The method of claim 1, wherein an exception output is generated for those portions of said input string that cannot be parsed into parse elements or that do not seem to fit into said fractal semantic network.

10. The method of claim 9, wherein said exception output can be processed by  
5 a special tool to allow a subsequent parsing into parse elements or a subsequent inclusion in said fractal semantic network.

11. The method of claim 10, wherein said special tool allows human interaction.

12. The method of claim 1, wherein lexical information is taken into  
10 consideration during said parsing step.

13. The method of claim 1, wherein grammar rules are taken into consideration during said parsing step.

14. The method of claim 1, wherein word stemming is applied.

15. The method of claim 1, wherein a syntactic analysis and/or a semantic  
15 analysis of said input string is performed during said parsing step.

16. The method of claim 1, wherein said set of mapping rules comprises a first set of rules which define that parse elements representing nouns, verbs, qualifiers, subordinate conjunctions, or prepositions are mapped into said information objects.

17. The method of claim 1, wherein said set of mapping rules comprises a second set of rules which define that parse elements representing determiners, adverbs, adjectives, and infinitives are mapped into attribute objects.

18. The method of claim 1, wherein said fractal semantic network is a first guess of the input string's words.

19. The method of claim 1, wherein knowledge is presented in said fractal semantic network as an associative network.

20. A system which processes an input string to generate a fractal semantic network, the system comprising:

a parser which processes said input string to generate an initial parse structure comprising a plurality of parse elements;

a processing module which converts said initial parse structure into said fractal semantic network, comprising components

which generate self-similar information objects from some of said parse elements by employing a first set of mapping rules for mapping certain types of parse elements into said information objects;

5 which generate self-similar connection objects from some of the parse elements by employing a second set of mapping rules for mapping certain types of parse elements into said connection objects; and

10 which arrange said information objects and said connection objects in a fractal manner according to the relation between the respective information objects and connection objects, where the relation between the information objects is represented by the connection objects, whereby the information objects and the connection objects are derived from a small set of basic building blocks.

21. The system of claim 20, wherein said parse elements comprise a classifier characterizing the type of the parse element, and a representation describing the relation between the parse elements, and feature information describing the features of the parse  
15 element.

22. The system of claim 20, wherein said parser is a slot grammar parser.

23. The system of claim 20, wherein there are hierarchical connection objects and non-hierarchical connection objects.

24. The system of claim 23, wherein due to the fact that hierarchical connection objects are employed, said fractal network structure has at least two levels of hierarchies.

25. The system of claim 20, wherein said fractal semantic network is self-similar across all hierarchies since said information objects and said connection objects are derived from said small set of basic building blocks.

26. The system of claim 20, wherein the system generates an exception output for those portions of said input string that cannot be parsed into parse elements by said parser or for those semantic units that do not seem to fit into said fractal semantic network.

27. The system of claim 26, further comprising a special tool to allow the subsequent parsing of said exception output said parse elements, or the subsequent insertion of said semantic units into said fractal semantic network.

28. The system of claim 27, wherein said special tool enables human interaction with the system.

29. The system of claim 20, comprising a memory with lexical information for consideration during said parsing step.

30. The system of claim 20, comprising a memory with grammar rules for consideration during said parsing step.

5 31. The system of claim 20, wherein said first set of mapping rules is accessible by said processing module, and wherein said first set of mapping rules defines that semantic units representing nouns, verbs, subordinary conjunctions, or prepositions are mapped into said information objects.

32. The system of claim 20, wherein said second set of mapping rules is  
10 accessible by said processing module, and wherein said second set of mapping rules defines that semantic units representing determiners, adverbs, adjectives, and infinitive to are mapped into attribute objects.

33. The system of claim 20, wherein said fractal semantic network is a first guess of said input string's words.

15 34. The system of claim 20, further comprising an output device which provides said fractal semantic network to another system or software module.

35. The system of claim 20, further comprising an input device which allows human interaction.

36. A text processing system comprising a system according to claim 20.

37. A speech processing system comprising a system according to claim 20.

5 38. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for processing an input string to generate a fractal semantic network, said method comprising the steps of:

10 parsing said input string to generate an initial parse structure comprising a plurality of parse elements;

generating semantic units from some of said parse elements by employing a set of mapping rules which maps certain types of parse elements into said semantic units, whereby some of said semantic units are information objects and some are connection objects;

15 generating said fractal semantic network by arranging said information objects and said connection objects in a fractal manner, where the relation between said



information objects is represented by said connection objects, whereby said information objects and said connection objects are derived from a small set of basic building blocks.

39. The program storage device of claim 38, wherein said parse elements comprise a classifier characterizing the type of said parse element, and a representation  
5 describing the relation between said parse elements, and feature information describing the features of said parse element.

40. The program storage device of claim 38, wherein there are hierarchical connection objects and non-hierarchical connection objects.

41. The program storage device of claim 40, wherein due to the fact that  
10 hierarchical connection objects are employed, said fractal network structure has at least two levels of hierarchies.

42. The program storage device of claim 38, wherein an exception output is generated for those portions of said input string that cannot be parsed into parse elements or that do not seem to fit into said fractal semantic network.

15 43. The program storage device of claim 42, whereby said exception output can be processed by a special tool to allow a subsequent parsing into parse elements or a subsequent inclusion in said fractal semantic network.

44. The program storage device of claim 43, whereby said special tool allows human interaction.

45. The program storage device of claim 38, wherein a syntactic analysis and/or a semantic analysis of said input string is performed during said parsing step.

5 46. The program storage device of claim 38, wherein said set of mapping rules comprises a first set of rules which define that parse elements representing nouns, verbs, qualifiers, subordinate conjunctions, or prepositions are mapped into said information objects, and a second set of rules which define that parse elements representing determiners, adverbs, adjectives, and infinitive to are mapped into attribute objects.

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